

Prevention of Diabetes Mellitus Focusing on Diet Patterns and Blood Sugar Check

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Abstract

The incidence of diabetes is projected to continue to increase to 643 million in 2030. If this continues, the number will jump to 783 million people in 2045, So it is important to improve health status by providing education on the prevention of diabetes mellitus with a focus on diet and blood sugar checks in adults. The aim of this community service is to detect diabetes mellitus early and prevent it in the community. Efforts are being made to improve health status by providing diabetes mellitus education with a focus on diet and blood sugar checks. The pre-test results showed that most of the 20 respondents (70.8%) had quite good knowledge, the post-test results showed that 45 respondents (100%) had good knowledge. The results of the GDS examination were obtained from 28 respondents, 7 respondents detected high GDS. It can be concluded that there is an increase in knowledge after being given counseling, so it is very important that this community service is implemented.

A. Introduction

Diabetes Mellitus (DM) is a chronic disease characterized by blood glucose levels exceeding normal and metabolic disorders carbohydrates, fats and proteins caused by a lack of the hormone insulin relatively (Mukhtar et al., 2020). Diabetes is called the silent killer because almost one-third of people with diabetes do not know they have Diabetes Mellitus until the disease develops into a serious one that affects organs or other body systems and results in complications, such as blood vessel damage, nerves and other internal structures (Dilworth et al., 2021). DM is confirmed when a blood glucose test fasting ≥ 126 mg/dl, random blood glucose levels if more than 200 mg/dl, test oral glucose tolerance ≥ 200 mg/dl, HbA1C results $\geq 6.5\%$.

Diabetes Mellitus (DM) is a chronic disease that occurs when the pancreas cannot produce enough insulin or when the body cannot use the insulin it produces effectively (Shaikh et al., 2022). Insulin is a hormone that regulates blood sugar levels (Flak et al., 2020). Hyperglycemia, or increased blood sugar levels, is a common effect of uncontrolled diabetes, which causes serious damage to many body systems, especially the nerves and blood vessels (Mishra et al., 2024).

The International Diabetes Federation or IDF stated that diabetes is one of the fastest growing global health emergencies in the 21st century. In 2021, 537 million adults aged 20-79 years worldwide had diabetes (Yameny, 2024). In 2022, people with diabetes in urban areas were much more than in rural areas with a prevalence of 12.1% in urban areas and 8.3% in rural areas. The incidence of diabetes is projected to continue to increase to 643 million in 2030. If this continues, the number will jump to 783 million people in 2045 (Ikwuka et al., 2023).

The number of people with type 2 diabetes mellitus (T2DM) in Singapore, a city-state in Southeast Asia with a population of 6.5 million, is estimated to grow from 400,000 to 670,000 in 2030 and to an alarming 1.0 million in 2050 (Tan et al., 2019). Based on the Central Java Provincial Health Profile, Diabetes Mellitus is the second largest proportion of non-communicable diseases reported at 13.4%. There are 652,822 people

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with Diabetes Mellitus in Central Java Province. The prevalence of Diabetes Mellitus in Sukoharjo Regency is 2.02%. This shows that the estimated number of Diabetes Mellitus sufferers in 2020 is 16,302 people. Various efforts to prevent Diabetes Mellitus

Primary prevention is aimed at at-risk groups that can be done by counseling on healthy lifestyles through weight loss programs to achieve ideal body weight, physical exercise, and stopping smoking habits or pharmacological interventions. Secondary prevention is an effort to prevent or inhibit the occurrence of complications in patients who have been diagnosed with DM. Secondary prevention includes controlling glucose levels and risk factors for complications, conducting early detection of complications and counseling programs that play an important role in increasing patient compliance in undergoing treatment programs so as to achieve the expected therapeutic targets. Tertiary prevention is aimed at groups of diabetes sufferers who have experienced complications in an effort to prevent further disability and improve quality of life. Rehabilitation efforts for patients are carried out as early as possible, before the disability persists. In tertiary prevention efforts, counseling is still carried out for patients and families. Counseling materials include rehabilitation efforts that can be carried out to achieve optimal quality of life. Tertiary prevention requires comprehensive and integrated health services between related disciplines, especially in referral hospitals.

Based on this background, community service is carried out related to efforts to improve health levels through counseling on diabetes mellitus prevention with a focus on diet and blood sugar examinations in adults in Mojorejo Village .

B. Methods

The method of implementing community service includes preparation, implementation, and post-implementation, namely: the activity period is 3 months, the criteria for the target community for activities for Adults in Mojorejo Village, and the number of people involved in the community as respondents, community leaders who provide permission, and a community service team consisting of those who provide counseling, GDS checks, documentation. Population of Adults in Mojorejo Village sample of 28 respondents, knowledge input in the form of a questionnaire

Implementation stage:

1. Preparation
 - a. Carrying out preparations for organizing activities.
 - b. Informing about the activities that will be carried out through local residents' meetings.
 - c. Doing task division.
 - d. Coordinate with the local RT head regarding the activities to be held.
 - e. Prepare the equipment to be used .
 - f. Preparing activity notes
2. Implementation
 - a. Make a registration.
 - b. Prites before the activity
 - c. Motivate the community to participate in the activity from start to finish .
 - d. Recording activities that have been carried out.
3. After Implementation
 - a. Motivating residents to continue participating in health education activities as a preventive measure
 - b. Conduct evaluation with post test
 - c. Conduct meetings with community leaders and regional leaders to convey activity results.

C. Results and Discussion

Community service has been carried out related to efforts to improve health levels through counseling on preventing diabetes mellitus with a focus on diet and blood sugar checks in adults in Mojorejo Village with the following results:

1. Characteristics (Age, Education, Occupation, Gender)

Table 1. Characteristics (Age, Education, Occupation, Gender)

No	Respondent Characteristics	Amount	Percent
1	Age		
	<60	16	57%
	>60	12	42.8%
2	Work		
	Housewife	20	71.4%
	Laborer	4	14.2%
	D trade	2	7.1%
	Self-employed	1	3.5%
	Retirement an	1	3.5%
3	Education		
	TS	4	14.2%
	SD	16	57.2%
	JUNIOR HIGH SCHOOL	4	14.2%
	Senior high school	3	10.7%
	Bachelor	1	3.5%
4	Kelmin type		
	Man	7	25%
	Woman	21	75%
	Total	28	100%

Based on the characteristics of respondents above the age of 42.8%, most of them have elementary school education of 57.2%, most of them are housewives of 71.4%, most of them are female of 75%.

2. Extension Activities

activity was attended by 28 adults, the activity ran smoothly, respondents were active in the question-and-answer discussion session.

a. Pre-education Questionnaire Results

Table 2. Pre-education Questionnaire Results

No	Category	Amount	Presentation
1	Good	-	-
2	Pretty good	20	70.8%
3	Not good	8	29.2%
	TOTAL	28	100%

Based on the pre-test results above, it shows that the majority of 20 respondents (70.8%) have quite good knowledge, while 8 students (29.3%) have less knowledge.

b. Post Questionnaire Results conducted education

Table 3. Post Questionnaire Results conducted education

No	Category	Amount	Presentation
1	Good	18	64%
2	Pretty good	10	35.7%
3	Not good	-	-
	TOTAL	28	100%

Based on the pre-test results above, it shows that 45 students (100%) have good knowledge.

1. Distribution of Random Blood Sugar Test Results

Table4. Distribution of Random Blood Sugar Test Results

No	DM/No DM	Amount	Percent
1	DM	7	25%
2	No DM	21	75%

No	DM/No DM	Amount	Percent
		28	100%

Based on the results of the GDS examination obtained from 28 respondents, 7 respondents were detected with high GDS.



Figure 1. Documentation

Community service is an effort to disseminate science, technology, and art to the community. These activities must be able to provide added value to the community, both in economic activities, policies, and behavioral changes (social). Describe that community service activities have been able to provide changes for individuals/communities and institutions in both the short and long term.

In this section, describe how the activities are carried out to achieve the objectives. Explain the indicators of achieving the objectives and the benchmarks used to state the success of the community service activities that have been carried out. Reveal the advantages and disadvantages of the output or main focus of the activity when viewed in terms of its suitability to the conditions of the community at the location of the activity. Also explain the level of difficulty in implementing the activity or producing goods and opportunities for future development. The article can be strengthened with relevant documentation related to services or goods as outputs, or the main focus of the activity. Documentation can be in the form of images of the application or implementation process, images of product prototypes, tables, graphs, and so on.

Based on the results of community service Efforts to Improve Health Levels with Diabetes Mellitus Prevention Counseling with a Focus on Diet and Blood Sugar Examination in Adults in Mojorejo Village, Bendosari, Sukoharjo, the results were obtained from 28 respondents. Based on the characteristics of respondents above the age of most >60 years by 42.8%, most jobs are elementary school education of 57.2%, most jobs are housewives of 71.4%, most are female gender of 75%. Based on the results of the GDS examination obtained from 28 respondents, 7 respondents were detected with high GDS.

Diabetes mellitus is an important public health problem and is one of the four priority non-communicable diseases targeted for follow-up by world leaders. The number of cases and prevalence of diabetes mellitus has continued to increase over the past few decades WHO. Diabetes mellitus or diabetes is a disease in which blood sugar levels are high because the body cannot release or use insulin.

Diabetes Mellitus is a metabolic disorder that is genetically and clinically heterogeneous with manifestations in the form of loss of carbohydrate tolerance (Banday et al., 2020). Diabetes Mellitus (DM) is a metabolic disorder in which there is an inability to oxidize carbohydrates, due to disruption of the normal insulin mechanism, causing hyperglycemia, glycosuria, polyuria, thirst, hunger, thin body, weakness, acidosis, often causing dyspnea, lipemia, ketonuria and finally coma (Lima et al., 2022). Hyperglycemia is a condition of increased blood glucose from the normal fasting range of 80-90 mg/dl of blood, or a non-fasting range of around 140-160 mg/100 ml of blood (Purnawati et al., 2024)

There are four pillars of DM management including education, medical nutrition therapy, physical exercise, and pharmacological intervention (Ningsih et al., 2024). DM management begins with dietary regulation and physical exercise for 2-4 weeks. If the target blood glucose level has not been achieved, pharmacological intervention can be given. Pharmacological intervention consists of oral and/or insulin injections. If blood glucose levels are not well controlled ($\text{HbA1C} > 6.5\%$) within 3 months with 2 oral drugs, it is an indication to start combination therapy of oral hypoglycemic drugs with insulin. However, if

blood glucose levels worsen marked by random blood glucose levels > 300 mg/dL, fasting blood glucose levels > 250 mg/dL or HbA1C levels $> 10\%$ then insulin therapy is the next therapeutic option.

The role of Diabetes education nurses is a process of education and training on Diabetes knowledge and skills that can support behavioral changes needed to achieve optimal health levels, psychological adjustment and a better quality of life in a sustainable manner. In its implementation, several meetings need to be held to refresh, remind the principles of Diabetes management so that they can care for themselves independently. Education plays a very important role in the management of type 2 DM because by providing knowledge to patients it can influence changes in behavior and patient motivation in the management of diabetes mellitus patients (Ramadhan, 2019).

Diabetes education is considered as one of the therapeutic methods and is an integral part of nursing care for people with diabetes. This educational process should consist of topics including DM pathophysiology, nutrition and diet management, pharmacological interventions, activity and exercise, self-monitoring of blood glucose levels, prevention and management of acute and chronic complications, psychosocial adjustment, coping skills, stress management, use of the health care system. Patient knowledge about diabetes mellitus is a means to help sufferers manage diabetes throughout their lives. Counseling is an important factor in the management of diabetes mellitus, especially in implementing a good diet because this counseling can provide knowledge and skills in implementing the diet properly (Kaluku, 2021).

Health education as an effort and activity carried out by nurses as one form of nursing implementation in individuals, families and communities to improve the client's ability to achieve optimal health. Health education is very important to be provided by nurses to change the behavior of individuals, families and communities so as to achieve healthy living behavior. Through the health education provided, it is expected that individuals, families and communities can experience changes in the way of thinking, how to behave and how to behave so that they can help overcome existing nursing problems, help the success of medical therapy being undertaken, prevent the occurrence or recurrence of diseases and form healthy living behavior.

Nutrition education that provides information about healthy eating patterns and practical ways to achieve healthy eating patterns is needed for people with DM. By providing education and counseling related to diet for people with DM, it is hoped that the knowledge of DM patients will increase, be able to improve metabolic control with stable blood glucose levels, prevent further complications and maintain a good quality of life for people with diabetes mellitus. This is in line with the results of community service carried out by Carolina (2018) stating that by providing health education to patients with diabetes mellitus, their knowledge will also increase.

The more often a person receives education, the better their behavior will be. The more often DM patients receive education, the better their behavior, especially in choosing low glycemic index foods. Increasing the knowledge of DM sufferers, blood glucose levels can be regulated to remain within the normal range and prevent DM complications through the selection of the right food ingredients (Eliza et al., 2023). Education and counseling about diet for Diabetes Mellitus sufferers is important to maintain the health condition of Diabetes Mellitus sufferers. DM diet as one effort to prevent further complications. What needs to be considered regarding the DM Diet is 3J: type of food, amount, and schedule arrangement (Khusaini & Sodik, 2020). By carrying out community service, people who suffer from DM can be detected, and education on the selection of the right food ingredients can be provided so that it is hoped that it can increase public knowledge regarding the DM diet. The results of this activity are that Diabetes Mellitus sufferers gain knowledge about the DM diet and can implement it properly in their daily lives. Thus, it is hoped that blood glucose can be prevented and controlled.

D. Conclusion

The results of the GDS examination were obtained from 28 respondents, 7 respondents were detected with high GDS. It can be concluded that there was an increase in knowledge after being given counseling, so it is very important for this community service to be carried out .

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